

REMARKS

Claims 1-9, 18, 19, and 20 are now in the case for examination. Claims 10-17 are withdrawn and will be cancelled upon the allowance of claims.

Support for amended claims is found on paragraphs 41, 42 and 43 on page 9.

The rejection of claim 1-9, under 35 U.S.C. § 103(a) for being unpatentable over Izutsu et al. , U.S. Patent No. 6,355,084 in view of Hammer et al., U.S. Patent No. 6,759,022 and the prior art on page 4, paragraph 13 have been overcome by amendment to the claims.

The Applicants' invention is directed to a simplified process for the removal of acid anhydride precursor gases and acid moieties, specifically SO_2 , NO_x , CO_2 , HCl and HF (New claim 18). The Applicants' process provides for the cooling of flue gases containing acid anhydride precursors, removing particulate, oxidizing the precursors and simultaneously converting the acid anhydrides and other acid moieties to ammonia salts. Applicants' invention is not directed to removal of selected acid anhydride precursors. Alternately, as claimed in new claim 19, the Applicants invention is directed and simultaneous conversion of SO_2 , NO_x , HCl and HF to ammonia salts followed by the conversion of CO_2 , to an ammonia salt. The prior art suggests the removal of selected components, not the simultaneous conversion and collection of acid anhydride precursors and acid moieties. The references cited by the Examiner do not suggest the removal of CO_2 from flue gases with the use of ammonia compounds.

Izutsu et al., U.S. Patent 6,355,084, is directed to the production of a fertilizer by injecting ammonia into and applying an electron beam to a gas containing sulfur oxides. Izutsu does not teach the simultaneous conversion of acid anhydrides and acid moieties, which includes HCl , HF and CO_2 (claim 18) to ammonia salts. The Applicants argue that the invention as now claimed is novel and unobvious over Izutsu, U.S. Patent No. 6,355,084.

Hammer et al., U.S. Patent 6,759,022, is directed to the sequential removal of acid gases and NO_x from flue gases. The acid gases absorbed by sequential scrubbing with a scrubbing medium. NO_x gases are then oxidized. The resulting mix is reacted with ammonium hydroxide to form ammonium nitrate. Hammer does not teach the simultaneous conversion of acid anhydride precursors, including SO_2 , NO_x , and CO_2 , and acid moieties, including HCl and HF , to ammonium salts. Hammer do not suggest or disclose the regenerability of the ammonia-containing compounds, as covered by claims 3 and 20 of the Applicants' application. The Applicants argue that the invention as now claimed is novel and unobvious over Hammer, U.S. Patent No. 6,759,022. As the two references cited by the Examiner disclose the selective removal of some flue gas contaminants, the Applicants argue that the combination of these references does not suggest the simultaneous removal of the acid anhydride precursors and acid moieties as claimed in the instant application. Applicants further argue that their invention is novel and unobvious over Izutsu in view of Hammer. Therefore, claims 1-9, 18, 19 and 20 are clearly novel, unobvious and patentable.

In like manner to the limitations of claim 1, wherein gaseous anhydrides are oxidized to higher gaseous acid anhydrides of claim 2; further wherein the step of converting includes reacting the oxidized anhydrides with ammonia-containing compounds in claim 3; further wherein the ammonia-containing compounds are water-soluble compounds selected from the group consisting of aqueous ammonia, ammonium hydroxide, ammonium carbonate, ammonium carbamate, and combinations thereof in claim 4; wherein the ammonia-containing compounds are regenerated by the thermal decomposition of ammonium bicarbonate (NH_4HCO_3) to carbon dioxide (CO_2), ammonia solution (NH_4OH), ammonium carbonate ($(\text{NH}_4)_2\text{CO}_3$), and combinations thereof of claim 5; wherein the process is carried out at

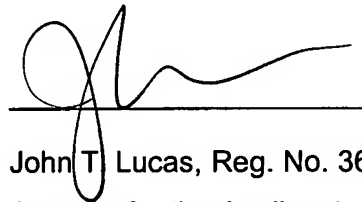
temperatures of from about 15°C to 50°C in claim 6; wherein the regeneration is carried out at a temperature from about 35°C to 80°C of claim 7; wherein ammonia generated from the decomposition of ammonium bicarbonate is recycled for use in the converting step of claim 8 and wherein the other acid moieties are hydrogen halides of claim 9 are not obvious over Iztsu in view of Hammer.

The prior art made of record and not relied upon by the Examiner has been carefully reviewed by Applicants' attorney. None of these cited references anticipate Applicant's invention as now claimed.

CONCLUSION

The Applicants believe that the application, including claims 1-9, 18 and 19, is now in allowable form. Allowance is therefore respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'John T. Lucas', is written over a horizontal line.

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